REMARKS

Claims 1-20 are pending in this application. Attached hereto is a complete listing of all claims in the application, with their current status listed parenthetically. By this Response, no claims are amended, cancelled or withdrawn.

Rejection Under 35 U.S.C. § 103

In paragraph 2 of the Office Action, claims 1-4, 6-9, 11-17 and 19-20 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. patent 6,754,195 ("Webster") in view of U.S. Patent 7,079,827 ("Richards"). Applicant respectfully traverses this rejection.

A. The Law of Obviousness

The Supreme Court recently reaffirmed the *Graham* factors in the determination of obviousness under 35 U.S.C. § 103(a). The four factual inquiries under *Graham* are:

(a) determining the scope and contents of the prior art;
(b) ascertaining the differences between the prior art and the claims in issue;
(c) resolving the level of ordinary skill in the pertinent art; and
(d) evaluating evidence of secondary consideration.

In addition, Section 2141 of the M.P.E.P. provides basic considerations that apply to obviousness rejections:

(1) The claimed invention must be considered as a whole;
(2) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
(3) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
(4) Reasonable expectation of success is the standard with which obviousness is determined. (emphasis added)

Moreover, the Teaching, Suggestion or Motivation test was not rejected by the Court, and requires:

> "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined), must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art, and not based on the applicant's disclosure." M.P.E.P. § 2142.

I. All Claim Limitations neither Taught nor Suggested

Applicant submits that independent claims 1, 6 and 11 recite elements that are neither taught nor suggested in either Webster or Richards, or a combination thereof.

Specifically, independent claim 1 recites, in part:

> ". . .providing an ultra-wideband device, the ultra-wideband device structured to transmit a plurality of ultra-wideband pulses at a first chip rate;
> receiving a plurality of ultra-wideband pulses at a second chip rate; and
> **interpolating the received second chip rate pulses to the first chip rate.**"

And independent claim 6 recites in part:

> ". . .providing an ultra-wideband device **that includes a rate controller**, the ultra-wideband device structured to transmit a plurality of ultra-wideband pulses at a first chip rate;
> receiving a plurality of ultra-wideband pulses at a second chip rate; and
> **converting the received second chip rate pulses to the first chip rate.**

In the Office Action, the Examiner cites Richards for teaching ultra-wideband communications, and combines Richards with Webster, stating:

> "At the time the invention was made it would have been obvious to modify the mixed signal devices with [*sic*] first and second transceivers of Webster with the impulse radio transceiver of Richards et al. One of ordinary skill in the art would be motivated to do this since impulse radio systems are energy efficient."

The lack of a teaching, suggestion or motivation to combine Richards with Webster will be discussed in detail below, however, neither Richards nor Webster, alone or in combination, teach the above claim elements.

Specifically, the Examiner relies on Webster to teach all the claim elements except for "ultra-wideband." However, an examination of Webster's FIG. 2 reveals a mixed signal receiver 201 that uses a switch 205 to send "mixed mode packets" to the multi-carrier receiver 209 and

non-mixed mode packets to the single carrier receiver 207 (col. 6, line 44 to col. 7, line 4). Thus, Webster uses a switch 205 to send incoming packets to one of two different receivers for processing.

However, Applicant's independent claim 1 recites "interpolating the received second chip rate pulses to the first chip rate" and claim 6 recites a rate controller and "converting the received second chip rate pulses to the first chip rate." Webster fails to teach or suggest these claim elements, as Webster does not include a rate controller, nor does Webster perform the step of "interpolating" or "converting" as Webster simply uses a switch and two different receivers.

Regarding independent claim 11, the Examiner cites Figures 2 and 3, as well as various sections of the Webster specification for teaching the following claim elements:

> ". . .wherein either of, or both the first data frame and the second data frame are comprised of:
> an automatic gain control section;
> a power level section;
> an automatic gain control tuning section; and
> a synchronization section."

However, a reading of Webster fails to reveal any teaching or suggestion of Applicant's above-recited claim elements. Therefore, Applicant submits that these claim elements are neither taught nor suggested by Webster.

II. The References Must be Considered as a Whole and Must Suggest the Desirability and thus the Obviousness of Making the Combination

In the Office Action, the Examiner states the motivation to combine Richards with Webster as follows:

"At the time the invention was made it would have been obvious to modify the mixed signal devices with [*sic*] first and second transceivers of Webster with the impulse radio transceiver of Richards et al. One of ordinary skill in the art would be motivated to do this since impulse radio systems are energy efficient."

However, neither Webster nor Richards are concerned with energy efficiency. Instead Webster addresses the problem of compatibility between legacy 802.11b devices and "new" 802.11g devices (see Background) and Richards addresses the problem of interference by using power control for ultra-wideband devices (see Abstract).

In fact, when each reference is considered as a "whole" it becomes immediately clear that any attempt to combine results in an inoperable combination.

Webster teaches the "IEEE 802.11 standard" (col 1, line 22), and devices that operate in the 2.4 and 5 GHz bands. As is known in the art these devices are commonly known as 802.11a, 802.11b, and at the time of Webster's teaching, the "new" 802.11g (col. 1, lines 21-36). As is known in the art, 802.11a and 802.11b both operate in the 2.4 GHz band and have eleven, mostly overlapping, **22 MHz** wide channels. 802.11g operates in the 5 GHz band with 12 non-overlapping **20 MHz wide** channels.

Importantly, Webster teaches that "the 802.11b QPSK Barker chips and the 802.11a OFDM. . .waveforms are radically different" (col. 7, lines 62-64). FIGS. 4A and 4B show the RF spectrum occupied by each signal. The only difference is that the OFDM signal is more

"squared" at peak power, and has a smoother roll-off. Yet these signals are taught by Webster as being "radically different."

In stark contrast, Richards illustrates a single pulse spectrum 104 in FIG. 1B that occupies **4 Giga Hertz of RF spectrum (which is 20 times greater than Webster).** When repeated and mixed with a pseudo-noise code, the result looks like noise, as shown in FIG. 3.

If the two very similar signals illustrated in FIGS. 4A and 4B of Webster are "radically different," then a comparison with the signal illustrated in FIGS. 1B and 3 of Richards can only be described as "insanely different" or "radically-non-obviously different."

That is, when taken as a whole, it is very clear that the technology taught in Richards is extremely different than that taught in Webster. A Webster radio would only hear noise when trying to receive a Richards signal, and vice-versa.

These technologies are apples and oranges and when taken as a whole, neither reference teaches or suggests the desirability of a combination.

III. No Reasonable Expectation of Success

As discussed above, a basic consideration of obviousness is that there must be a reasonable expectation of success. That is, the combination of Richards with Webster must be operable.

However, the Examiner has simply grabbed Richards for a teaching of "ultra-wideband" and provided the motivation to combine as "energy efficiency." But neither Webster nor Richards are concerned with "energy efficiency." Richards teaches power control to avoid interference, but in the absence of the possibility of interference, Richards would blast at full power.

Moreover, according to M.P.E.P. § 2142.01 "if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima*

facie obvious."

As discussed above, Webster employs 802.11, which is a conventional carrier wave technology that employs continuous sinusoidal signals using 20 or 22 MHz wide communication channels.

In contrast, Richards teaches impulse radio technology that employs discrete electromagnetic pulses. FIG. 1A of Richards shows one 0.5 nanosecond pulse, and FIG. 1B shows that the 0.5 nanosecond pulse occupies about 4 gigahertz of frequency at a -12dB cutoff. Thus, a Richards receiver is constructed to receive a plurality of individual pulses that each occupy 4 GHz of radio frequency.

A Webster receiver, looking for a 20 MHz signal, would only see about 1/160th, or 0.625% of the 4 GHz signal transmitted by Richards. Moreover, the Webster receiver is constructed to receive a continuous sinusoidal signal. But Richards transmits individual pulses, each having a duration of 0.5 nanoseconds. Thus, a Webster receiver, looking for a continuous sinusoidal signal, would be completely unable to receive the pulses transmitted by a Richards radio.

Clearly, a fundamental change to Webster's principle of operation is required for the Examiner's proposed combination, and thus there is no reasonable expectation of success.

In view of the above discussion, Applicant respectfully requests the Examiner reconsider and withdrawal his rejection of independent claims 1, 6 and 11. Because claims 2-4, 7-9 and 12-17 depend from claims 1, 6 and 10, respectively, it is respectfully submitted that the rejection of claims 2-4, 7-9 and 12-17 have been traversed by virtue of their dependency from claims 1, 6 and 10, respectively. M.P.E.P. § 2143.03.

2nd Rejection Under 35 U.S.C. § 103

In paragraph 3 of the Office Action, the Examiner rejects claims 5 and 10 under 35 USC §103(a) as being obvious over Webster in view of Richards and further in view of U.S. patent 6,856,610 ("Schmidl"). Applicant respectfully traverses this rejection.

As described in the above remarks, Applicant submits that Webster and Richards are incapable of teaching the elements of the claimed invention. Although the Examiner cites to Schmidl, Schmidl does not provide the teachings missing in Webster and Richards.

As claims 5 and 10 depend from claims 1 and 6, respectively, it is respectfully submitted that the rejection of claims 5 and 10 have been traversed by virtue of their dependency from claims 1 and 6, respectively. M.P.E.P. § 2143.03.

3rd Rejection Under 35 U.S.C. § 103

In paragraph 4 of the Office Action, the Examiner rejects claim 18 under 35 USC §103(a) as being obvious over Webster in view of Richards and further in view of U.S. patent 5,463,657 ("Rice"). Applicant respectfully traverses this rejection.

As described in the above remarks, Applicant submits that Webster and Richards are incapable of teaching the elements of the claimed invention. Although the Examiner cites to Rice, Rice does not provide the teachings missing in Webster and Richards.

As claim 18 depends from claim 11, it is respectfully submitted that the rejection of claim 18 has been traversed by virtue of its dependency from claim 11. M.P.E.P. § 2143.03.

Conclusion

Applicant believes that this Response has addressed all items in the Office Action and now places the application in condition for allowance. Accordingly, favorable reconsideration and allowance of claims 1-20 at an early date is solicited. Should any issues remain unresolved, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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Date

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